

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555-0001

August 8, 2007

NRC INFORMATION NOTICE 2007-23      INADVERTENT DISCHARGE OF HALON 1301  
FIRE-SUPPRESSION SYSTEM FROM  
INCORRECT AND/OR OUT-OF-DATE  
PROCEDURES

**ADDRESSEES**

All holders of operating licenses for nuclear power reactors, except those who have permanently ended operations and have certified that fuel has been permanently removed from the reactor vessel. All holders of licenses for fuel cycle facilities.

**PURPOSE**

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of a recent event at a fuel cycle facility that involved the inadvertent discharge of a Halon 1301 fire-suppression system, as well as deficiencies in fire protection program elements, procedures, and administrative controls. NRC expects that recipients of this IN will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this IN are not NRC requirements; therefore, no specific action nor written response is required.

**DESCRIPTION OF CIRCUMSTANCES**

The following describes the site condition that existed, and sequence of events that occurred, which led to inadvertent discharge of a Halon 1301 fire-suppression system at an NRC licensed fuel cycle facility.

In December 2006, a small fire started on a heat trace for piping that was located outdoors at a licensed facility. A security station was contacted, the fire was announced, and the fire brigade was dispatched. The fire was immediately extinguished and power was removed from the circuit. After the fire was extinguished, supervision at the scene requested the security officer who was manning the security station to activate a manual fire alarm pull station, since plant fire protection procedures required the sounding of the plant fire alarm for any fire. As a result of miscommunication, the security officer activated a manual pull station that was associated with the Halon 1301 fire-suppression system, intended to protect the security station. Activation of this pull station resulted in the discharge of Halon into the security station.

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A manual fire alarm pull station had been previously located in the security station, but had been removed for the installation of a new fire alarm panel and had not yet been re-installed. In addition, the manual pull station associated with the Halon was in the area.

In this particular instance, the Halon 1301 fire-suppression system located in the security station is not credited in the licensee's safety basis to meet the requirements of either Title 10 of the *Code of Federal Regulations* (10 CFR) Sections 70.61 or 70.64 of 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material", since neither process equipment nor special nuclear materials exists in the security station.

After the Halon discharged, a plant supervisor directed that the Halon fire-suppression system be reset. The facility industrial safety specialist responsible for fire safety attempted to reset the Halon fire-suppression system. During this procedure, the Halon fire-suppression system was again actuated and the back-up tank was discharged. The two discharges depleted all Halon, causing the Halon 1301 fire-suppression system for the security station to be out of service. The licensee then implemented a fire-protection system impairment response, using appropriate compensatory measures.

The licensee's root cause evaluation determined that the lack of a manual fire pull station in the security station was identified as early as July 2006. A letter was sent to the security department from plant safety, noting the lack of a pull station, and that the security station operator would simply need to announce the fire and location over the plant paging system. This deviation from existing procedures was not communicated to shift operations personnel and was not incorporated into applicable plant procedures. The lack of up-to-date fire response procedures, coupled with poor communications, led directly to the inadvertent Halon discharge and the disabling of the fire-suppression system. As a corrective action, the licensee installed a fire alarm pull station in the security station.

The licensee also determined that there was no plant procedure for resetting the Halon fire-suppression system and the reset had been performed via skill-of-the craft, by an Industrial Safety Specialist who was generally knowledgeable of Halon fire-suppression systems. However, the Halon fire-suppression system had been maintained and serviced by an outside vendor. As a result, there was no specific procedural guidance for resetting the system back to normal operations.

Additionally, it was noted that over several years, pressure in the Halon 1301 cylinders was allowed to decrease approximately 100 pounds per square inch gauge (psig) below the initial charging pressure (360 to 400 psig). This conflicts with National Fire Protection Association 12A, "Standard on Halon 1301 Fire Extinguishing Systems," which indicates refilling or replacing a Halon 1301 cylinder when the pressure drops by 10 percent or more. Although monthly tank readings taken by the licensee, as well as an outside contractor, indicated that a slow system leak was in progress, no corrective action was taken and the deficiency was not entered into the licensee's corrective action system.

## **BACKGROUND**

10 CFR 70.61, "Performance Requirements," requires that certain fuel cycle licensees authorized to possess a critical mass of special nuclear material meet performance requirements for all credible high- or intermediate consequence events including radiological or chemical releases as a result of fires. Licensees and certificate holders regulated under 10 CFR Part 40, "Domestic Licensing of Source Material," or 10 CFR Part 76, "Certification of Gaseous Diffusion Plants," must also meet fire safety requirements that may require an operable automatic suppression system.

Additionally, 10 CFR 50.48, "Fire Protection," states that each operating nuclear power plant must have a fire protection plan that satisfies Criterion 3, "Fire Protection," in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and that this plan must describe specific features necessary to implement the fire protection program such as automatic and manually operated fire detection and suppression systems.

### Recent NRC Generic Communications Related to Fire Protection

- NRC IN 2007-19, "Faulty Active Fire Protection Equipment," May 21, 2007;
- NRC IN 2007-17, "Fires at Nuclear Power Plants Involving Inadequate Fire Protection Administrative and Design Controls," May 3, 2007;
- NRC IN 2005-32, "Product Alert for Fire Hydrants," December 23, 2005;
- NRC IN 2005-01, "Halon Fire-Extinguishing System Piping Incorrectly Connected," February 4, 2005; and
- NRC Regulatory Issue Summary 2005-07, "Compensatory Measures to Satisfy the Fire Protection Program Requirements," April 19, 2005.

## **DISCUSSION**

Fire protection suppression and detection system reliability and performance capabilities are a primary feature of defense-in-depth and must be maintained to achieve effectiveness in preventing fire damage to structures, systems, and components important to safety.

In this event, the licensee's fire protection program failed to provide adequate procedural, administrative, and design controls to prevent inadvertent Halon 1301 fire-suppression system actuation.

## CONTACTS

This IN does not require any specific action nor written response. Please direct any questions about this matter to the technical contacts listed below or to the appropriate Office of Nuclear Reactor Regulation (NRR) or Office of Nuclear Material Safety and Safeguards (NMSS) project manager.

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Enclosure: List of Recently Issued FSME-NMSS Generic Communications

Note: A full listing of NRC generic communications may be viewed on the NRC public Web Site: <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

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**Recently Issued  
Federal and State Materials and Environmental Management Programs/  
Nuclear Material Safety and Safeguards Generic Communications**

Date	GC No.	Subject	Addressees
02/02/07	IN 07-03	Reportable Medical Events Involving Patients Receiving Dosages of Sodium Iodide Iodine-131 less than the Prescribed Dosage Because of Capsules Remaining in Vials after Administration	All NRC medical use licensees and NRC Master Materials Licensees. All Agreement State Radiation Control Program Directors and State Liaison Officers.
02/28/07	IN 07-08	Potential Vulnerabilities of Time-reliant Computer-based Systems Due to Change in Daylight Saving Time Dates	All NRC licensees and all Agreement State Radiation Control Program Directors and State Liaison Officers.
03/15/07	IN 07-10	Yttrium-90 Theraspheres <sup>®</sup> and Sirspheres <sup>®</sup> Impurities	All NRC Medical Licensees and NRC Master Materials Licensees. All Agreement State Radiation Control Program Directors and State Liaison Officers.
04/04/07	IN 07-13	Use of As-Found Conditions to Evaluate Criticality-related Process Upsets at Fuel Cycle Facilities	All licensees authorized to possess a critical mass of special nuclear material.
05/02/07	IN 07-16	Common Violations of the Increased Controls Requirements and Related Guidance Documents	All licensees who are implementing the NRC Order Imposing Increased Controls (EA-05-090), issued November 14, 2005, and December 22, 2005.
03/01/07	RIS 07-03	Ionizing Radiation Warning Symbol	All NRC licensees and certificate holders. All Radiation Control Program Directors and State Liaison Officers

Date	GC No.	Subject	Addressees
03/09/07	RIS 07-04	Personally Identifiable Information Submitted to the NRC	All holders of operating licenses for nuclear power reactors and holders of and applicants for certificates for reactor designs. All licensees, certificate holders, applicants, and other entities subject to regulation by the NRC of the use of source, byproduct, and special nuclear material.
03/20/07	RIS 07-05	Status and Plans for Implementation of NRC Regulatory Authority for Certain Naturally-occurring and Accelerator-produced Radioactive Material	All NRC materials licensees, Radiation Control Program Directors, State Liaison Officers, and NRC's Advisory Committee on the Medical Uses of Isotopes.
04/05/07	RIS 07-07	Clarification of Increased Controls for Licensees That Possess Collocated Radioactive Material During Transportation Activities	All NRC licensees issued NRC's Order Imposing Increased Controls and all Radiation Control Program Directors and State Liaison Officers.
05/04/07	RIS 07-09	Examples of Recurring Requests for Additional Information for 10 CFR Part 71 and 72 Applications	All holders of, and applicants for, a: (1) 10 CFR Part 71 certificate of compliance (CoC) for a radioactive material transportation package; (2) 10 CFR Part 72 CoC for a spent fuel storage cask; and (3) 10 CFR Part 72 specific license for an independent spent fuel storage installation.
05/15/07	RIS 07-10	Subscriptions To New List Server For Automatic Notifications Of Medical-Related Generic Communications, <i>Federal Register</i> Notices And Newsletters	All NRC medical-use licensees and NRC Master Materials licensees. All Radiation Control Program Directors and State Liaison Officers.

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Enclosure